IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Andreas Seidel et al.
Serial No.	:	10/627,015
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For	:	FLAME-RESISTANT POLYCARBONATE MOLDING COMPOSITIONS
Art Unit	:	1614
Examiner	:	Peter A. Szekely

D E C L A R A T I O N

I, Andreas Seidel, residing at Birnenweg 5, 41542 Dormagen, Germany, declare as follows:

1) that I have the following technical education and experience:

   a) I am a chemist having studied at the University of Dortmund, Germany, from 1988 to 1997,

   b) I received the degree of doctor rer. nat. at the University of Dortmund in the year of 1997,

   c) I am employed by Bayer AG since 1999 in the Research Department especially handling polymer blends;

2) that the following tests were carried out under my immediate supervision and control:

Experimental results

Component A3

Linear polycarbonate based on bisphenol A, with a weight average molecular weight (M_w) of 28,000 g/mol (measured by GPC).

Component B1

ABS graft polymer produced by mass polymerization with an A/B/S weight ratio of 20%/13%/67% containing SAN with a weight average molecular weight (M_w) of 80,000 g/mol (measured by GPC).

Component B3

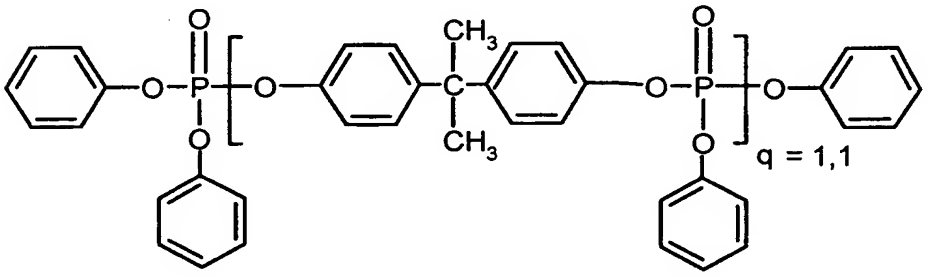
ABS graft polymer produced by mass polymerization with an A/B/S weight ratio of 21%/7%/72% containing SAN with a weight average molecular weight (M_w) of 80,000 g/mol (measured by GPC).

Component B4

ABS graft polymer produced by mass polymerization with an A/B/S weight ratio of 20.5%/11.5%/68% containing SAN with a weight average molecular weight (M_w) of 80,000 g/mol (measured by GPC).

Component C

Bisphenol A-bridged oligophosphate (BDP)



Component D

Blendex 449: PTFE preparation from General Electric Plastics consisting of 50 wt.% PTFE and 50 wt.% SAN copolymer.

Component F

Pural® 200: nanoscale basic aluminium oxide from Condea (Hamburg, Germany) with an average maximum particle diameter of 50 nm.

Component G

G1: pentaerythritol tetrastearate (PETS)

G2: ☐hosphate stabilizer

Production and testing of the molding compositions according to the invention

The components are mixed in a twin-screw extruder (ZSK25) from Werner und Pfleiderer, at a mass temperature of 240°C. The molded bodies are produced at the same melt temperature and a mold temperature of 80°C in an Arburg 270 E injection molding machine.

The notched impact resistance a_k is measured to ISO 180/1 A.

The combustion behavior of the samples is measured to UL-Subj. 94V on bars measuring 127 x 12.7 x 1.5 mm.

The melt viscosity is measured at 260°C and a shear rate of 1000 s^{-1} to DIN 54811.

The stress cracking behavior under the influence of chemicals (ESC behavior) is tested on bars measuring 80 mm x 10 mm x 4 mm. A mixture of 60 vol.% toluene and 40 vol.% isopropanol is used as the test medium. The test specimens are pre-strained using an arc-shaped jig (boundary fibre strain ε_x is 3.2%) and stored at 23°C in the test medium. The time to break is measured under these conditions.

The creep behavior (creep resistance) is measured in a tensile test on shoulder bars measuring 70 mm x 40 mm x 10 mm. The bars are subjected to a constant tension of 50 MPa at 23°C and the time to break is detected. The time to break is a measure of the creep resistance under these conditions.

A summary of the characteristics of the molding compositions according to the invention is given in Table 1.

The data show that compositions 7 and 8 with mass ABS having a butadiene content of 13 and 11.5 wt.-%, respectively, compared with compositions with mass ABS containing 7 wt.-% (comparative example B*) result in clear improvements in resistance to stress cracking as under the influence of chemicals and in a_K-values while maintaining good values of melt flowability, creep resistance and flame-resistance.

Table 1: Molding compositions and their characteristics

		7	B*	8
Components [parts by weight]				
A3	PC3	70	70	70
B1	Mass ABS 1	15.1	-	-
B3	Mass ABS 3	-	15.1	-
B4	Mass ABS 4	-		15.1
C	BDP	12.5	12.5	12.5
D	PTFE-SAN master batch	1	1	1
F	Nanoscale inorgan. Material	0.9	0.9	0.9
G1	PETS	0.4	0.4	0.4
G2	Phosphite stabilizer	0.1	0.1	0.1
Butadiene content of components B [wt.-%]		13	7	11.5
Characteristics				
Creep resistance – time to creep failure [h]		15	58	13
Stress cracking resistance – time to break [min]		20	8	15
a_k [kJ/m²]		14	7	13
UL94V-score		V-0	V-0	V-0
Melt viscosity [Pas]		163	130	147

* Reference example

Although the invention has been described in detail in the foregoing for the purpose of illustration, it is to be understood that such detail is solely for that purpose and that variations may be made therein by those skilled in the art without departing from the spirit and scope of the invention except as it may be limited by the claims.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

ANDREAS SEIDEL

Signed at Dormagen, this 2nd day of May ,2006.